3

Overview Of Emission Factors And Inventory Methods

3.1 Inventory Development Procedures

Emission inventories are the basis of essentially all air quality management activities. Inventory data can be applied to a variety of analyses and for several different purposes. Similarly, inventory data can be prepared using different methodologies, with specificity and detail consistent with that required for the particular application.

Emission factors are often applied to common activity data to develop emission estimates. Emission factors can also be estimated using a variety of techniques, each with its own specificity and accuracy for different applications. In other cases, emission rates depend on some other variable(s) (e.g., temperature, wind speed, soil moisture, or process parameters). In those cases, an algorithm is applied to estimate emissions for the particular set of conditions. Under certain circumstances, emission factors and emissions estimation techniques are applied to sources and/or for analyses other than those for which they were developed. This situation arises most frequently in analyses of emerging air quality issues that are based on an incomplete foundation. Currently, this situation can affect some sources important in PM-2.5 planning activities. The following discussion will serve as a brief introduction to the various approaches used to develop emission factors and other inventory estimation methods. The discussion is provided to assist readers in understanding the strengths and weaknesses of these various approaches, and to prioritize those activities that could improve the understanding of PM-2.5 issues in specific situations and locations.

3.1.1 Direct Measurements and Indirect Estimation Approaches

Generally, direct measurements of emissions from specific sources provide the most accurate emission factors and emissions estimates. For this reason, EPA encourages sources to conduct direct emission factor tests. Unfortunately, the source testing required to obtain these direct measurements is expensive and even direct measurements can produce misleading results for sources that have variable operating characteristics. In addition, EPA allows the use of emissions reference methods for testing to facilitate consistency among different sources and to increase the reliability of emission factors when they are applied to other untested sources with the same operating characteristics. These EPA methods should be used to the maximum extent possible in conducting both direct and indirect emission factor tests. There is no established EPA test method for PM-2.5 at this time. In some cases the emissions reference method itself can produce, either by design or inadvertently, a biased or incomplete result. For example, the Method 201 sampling train for particulate matter, adapted for PM-10, specifies that the sample line be heated to ensure the collection of only the filterable fraction. This particular situation does not present a significant problem for PM-10 analyses, since in most cases, the contribution of the condensable fraction, mostly less than one µm in diameter, is often minimal in terms of the total PM-10 mass.

The application of the Method 201 sampling train, with modifications to produce a size cutoff for PM-2.5 (to be termed Method 201B), is useful for measuring the filterable component of PM-2.5 emissions. Alternatively, conventional particle sizing techniques, such as cascade impactors, can be used to obtain filterable PM-2.5 emission factor data. Method 201B, however, would not represent accurately the mass of the condensable fraction of PM-2.5. For PM-2.5, this approach can create a considerable bias, particularly for some combustion sources. For example, the emission factor for the condensable fraction of PM-2.5 from natural gas combustion is three times the factor for the filterable fraction. (EPA, 1998b)

EPA encourages sources to include condensable particulate matter testing for sources that generate significant quantities of vapor phase material that would pass through a conventional filterable particulate sampling train. Currently, the EPA test method for condensable material is Method 202. Method 202 yields only the mass in a solvent extraction and the mass in an aqueous extraction after the sample is drawn through a water impinger. Therefore, this method precludes any further speciation to assist in understanding the nature of the condensable material. Resolution of the component species in the condensable mass may be required for use in receptor modeling studies. Direct measurements will still provide the most reliable estimates of emission rates for PM-2.5, but different methods will be needed to accurately capture the total (filterable plus condensible) PM-2.5 mass. EPA is working on the evaluation of methods for this purpose, but it will be some time before an EPA method is published for PM-2.5.

Indirect measurements are also often used in inventory development for sources and source categories that do not lend themselves to direct source sampling. Indirect measurement methods can be most effective for source categories that consist of a large number of individual sources that are highly consistent in their emissions characteristics or for sources that are spread out over large areas. Emission factors based on a representative sample of the total population of sources can then be applied with a high degree of reliability to the activity associated with the collection of all individual sources. An example is emissions from residential natural gas combustion sources. These units all operate similarly and an emission factor based on a representative sample provides a very reliable estimate of the emissions from all residential natural gas combustion. Therefore, indirect monitoring of the amount of natural gas consumed, allowing for theft and leakage, can be used to prepare the emissions estimates for these sources. Typically, emission factors based on indirect testing reflect the results of a few to more than 30 emission factor tests at different plants. The confidence level in the representativeness of an indirect emission factor increases as the number of individual sources that were tested increases and as the inherent process variability decreases.

Similarly, emissions for either agricultural burning or prescribed burning can be estimated from an equation that relates the emissions to parameters that describe the site, including the type and quantity of fuel burned, moisture content, etc. Indirect monitoring of the controlling parameters at the site to be burned can often be used to calculate a reasonable estimate that will represent the total emissions from a burn in that area. This type of estimate, which can also be applied to other source types, is considered indirect monitoring.

For sources with fugitive emissions, the emission factor test program should use well established fugitive capture techniques such as quasi-stack enclosures, ‘roof’ traversing, and upwind-downwind vertical emissions profiling. These techniques are among a number of fugitive emission capture techniques described in emission factor tests cited in AP-42. If innovative fugitive emission capture and testing techniques are required due to the specific characteristics of the source being tested, these techniques should be fully described and their limitations should be discussed in the test report. The release of tracer compounds within the plume of a fugitive emission source may improve the confidence in the test results. Test methods that rely in part on “back calculating” emissions from downwind ambient measurements using dispersion modeling are less desirable than capture techniques or vertical emissions profiling because of the additional assumptions required in the dispersion modeling.

3.1.2 CEM Data versus Application of Emission Factors

For some specific applications continuous emission monitors (CEMs) can be used. CEMs are monitoring techniques that measure emissions in a stack and record the concentration data to electronic storage media on a continuous basis. The best example of the use of CEMs for inventory purposes is found in the acid rain program (Title IV of the CAA). As part of the acid rain program, all affected utility and industrial combustion sources are required to install and operate CEMs to track total emissions of SO_2 and NO_x on a continuous basis. CEM type monitoring has the advantage of reflecting actual in-use emissions, including upsets and other unusual events. An obvious drawback of CEMs is the significant cost associated with the purchase, installation, operation, and maintenance of these systems. Another drawback of using CEMs for inventory development purposes is that large amounts of data are generated and converting all of these data into useable formats takes some effort and time with obvious cost implications. CEMs for application to PM-2.5 source testing will not be available until there is a FRM.

An emission factor is usually developed from a set of direct source emission tests. Frequently, the test series is designed to represent the typical range of size and operating conditions for that source type. If the average mass emission rate, expressed as a function of some readily available process related parameter, is constant, the average factor can be applied to all sources that fit the conditions of the test series. Often different factors are required for different size ranges or categories of operating conditions, but the average factors developed in this way are always applied universally to all other sources in the category, whether or not they were tested directly. These factors can then be applied to estimate emissions based on more easily measured activity data. For example, emissions of SO_2 from coal combustion can be estimated reliably based on measurements of the amount of coal burned and the average sulfur content of the coal. Emission factors provide emissions estimates with a high degree of confidence as long as the source matches the operating conditions of the sources that were tested to develop the emission factor. The reliability of emission factors decreases when only a few source tests are used to develop the factor. Emission factors based on a small number of tests may not reflect operational variability and application of these factors could introduce bias in emissions estimates when the operating conditions vary. The user can consult the background document for a particular emission factor in AP-42 to determine the number and type of tests used to develop the factor.

3.1.3 Area and Mobile Source Estimation Methods

Not only is it difficult to measure emissions directly from most area and mobile sources, but is it often difficult to measure spatially and temporally resolved activity data as well. Often, measures of the relevant activity can be estimated at the State-level or National-level through economic or other indicators that represent a particular activity. For some applications, acceptable estimates of emissions can be developed by applying an assumption to represent the distribution of that total to smaller spatial scales. In other cases, this approach can introduce unknown bias. For example, PM-2.5 emission estimates for construction activities in the National Emissions Trends (NET) inventory are based on activity estimates that are derived from total annual dollars spent on construction activity at the EPA region-level. These estimates are then allocated to counties using a procedure that depends on construction costs and estimates of acres under construction in each county. Obviously, this technique will result in approximations that will match actual county-level construction related emissions at varying degrees of accuracy. This is an example of a category for which locally obtained activity data can substantially improve an emission estimate. Other area source emissions estimates are based on State-level activity data that is then allocated through population, land use, or some other surrogate distribution factor.

Fires are important sources of PM-2.5 emissions in many locations. Prescribed burning (planned burning of natural areas), slash burning (land clearing), wildfires and to a lesser extent agricultural field burning can all contribute to ambient PM-2.5 loadings. While it is possible to measure the acres burned or biomass burned in the case of slash burning during these activities, other estimates about the fuel loading, moisture content of the fuel, and estimates of the specific wood types burned need to be estimated. This can be done by applying measurements that have been made in other nearby or similar land use types. The uncertainty associated with this kind of indirect emission estimation procedure is related to how well the assumptions on fuel type and fuel loading match the conditions of the area burned.

Similar issues arise when estimating emissions from mobile sources. Most mobile source emissions are calculated by applying an average emission factor expressed in terms of grams per vehicle mile traveled (g/VMT). Those factors are developed from a subset of actual in-use vehicles and are frequently based on controlled tests using a dynamometer. Those factors are then applied to an estimate of the total VMT at county resolution. Differences in the mix of vehicles, especially for heavy-duty diesel vehicles, or temporal activity patterns in any given area can introduce unwanted bias into the emissions estimate.

3.2 TYPES OF INVENTORIES AND INVENTORY APPLICATIONS

Planning for the development of an emission inventory depends on the type of air quality planning analysis it is intended to support. For example, approaches based on National-level or State-level activity data, and subsequent allocation to county or nonattainment area scales, can be useful for tracking trends or for evaluating air quality management programs over time. Those approaches are often referred to as top-down methodologies. In some cases, top-down methods provide reasonable estimates and improvement using local information is impractical if not impossible. In many instances, however, inventories at that level of detail are often inadequate for other more rigorous air quality management activities. For example, inventory improvements are usually needed to support an attainment demonstration and the development of a control strategy. That inventory needs to be source specific, spatially allocated to the correct scale, and representative of temporal variability that can affect the outcome of modeling exercises.

A discussion of the various types of inventories that can be developed and the types of analyses they support can be found in another document prepared by the Emission

Inventory Improvement Program (EIIP). (EIIP, 1997a) The level of detail needed in the emissions data to support the activities indicated decreases from Level 1 to Level 4. The categories of inventories discussed in that report are listed below:

- Level 1 - Source specific, used for permit and compliance programs;
- Level 2 - Urban scale, used for State Implementation Plan (SIP) and other large scale planning activities;
- Level 3 - Industry wide, applications that do not drive regulatory issues; and
- Level 4 - National and international Greenhouse Gas (GHG) issues.

Inventory issues in PM-2.5 planning will include: developing a baseline understanding of local and regional influences, reasonable further progress (RFP) planning and demonstration, modeling attainment demonstration, periodic inventories, emission statements, VMT reduction and transportation control measures (TCM) planning, regulatory development and cost analyses, etc. These examples are not inclusive of all of the applications of inventories in air quality management. Many of these analyses can build off of different levels of specificity and detail in terms of both specific emissions estimates and temporal or spatial resolution. The specific types of inventories required will be dependent on the types of analyses that need to be completed and the specifics of the particular areas. Some selected examples of specific types of analyses and the inventory needs to support those analyses are listed below:

- Emission control development and attainment modeling activities need source specific inventories with process level resolution. PM-2.5 programs need these data for the entire nation for both base-year and future-year controlled cases. These programs need estimates of primary, condensable and secondary contributions, representative temporal distributions, spatial allocation of nonpoint sources, and speciation profiles.
- Inventories with similar detail are needed for related air quality management activities, including source identification and prioritization, rule development, cost/benefit analyses, and compliance monitoring.
- RFP analyses can be based on inventories at lower resolution to track overall emission reductions or specific reductions from sources that have been controlled, combined with other broader growth estimates for the remaining parts of inventories.
- Emission statements can be prepared at industry level resolution, but may not need the species and temporal resolution required for air quality modeling to validate adoption and effects of emissions control rules.

The definition of a base-year has significant implications in PM-2.5 planning. First it will be necessary to define one base-year for all parts of the country to promote consistency in regional modeling analyses. The base-year needs to have a sufficient amount of appropriate monitoring data available to ensure that the specific problems that need to be addressed are identified. Specific areas will have to evaluate the occurance of natural events, unusual meteorological conditions, and any other external factors that could be affecting that base-year. Guidance on the development of PM-2.5 inventories has been posted through the EPA TTN Internet page. A cover memorandum explaining the implementation issues can also be found at the same TTN location. These documents can be found at the following Internet address:

http://www.epa.gov/ttn/oarpg/t1pgm.html

3.3 LEVEL OF DETAIL IN ACTIVITY DATA, EMISSIONS FACTORS, AND PROJECTION FACTORS

As mentioned earlier, many emission estimation methodologies for area and mobile sources depend on activity data that is itself hard to monitor directly. VMT for highway mobile sources, hours in operation for many off-highway mobile sources, and fuel use in residential wood heating are examples. This poses particular problems for PM-2.5 planning efforts since area and mobile sources represent such a large percentage of the overall emissions totals. This situation is similar to the problems encountered in developing inventories for VOC and NO_x to support ozone planning. Estimating emissions from both highway and off-highway diesel vehicles is a good example of this problem. Diesel vehicles will contribute a significant portion of elemental carbon found in most locations. A small number of dirty vehicles can contribute a large percentage of the overall emissions from mobile sources. The available methodologies for estimating VMT for highway sources and hours in operation for heavy diesel off-highway sources do not consider specific types of vehicles and assume that all vehicles are operated at conditions that are near optimum efficiency. Concerning highway vehicles, this problem is compounded by the fact that the VMT estimation method is targeted primarily to count gasoline-powered vehicles (passenger cars) and may introduce bias when applied to area wide estimates of the number of heavy-duty diesel vehicles.

Emission factors and speciation profiles are often developed for specific sources but are then applied as is or with minor modifications based on engineering assumptions to other related sources. It is possible that surrogate factors and/or size and speciation profiles will be used in early PM-2.5 planning activities, simply because factors and profiles will not be available for all sources. Many of those factors and distribution profiles that are available were developed several years ago, and may not be representative of current operating and production conditions.

Projection factors are frequently based on broad economic forecasts of industry sector growth. This technique does not consider changes in technology, productivity, and other issues that can influence the emissions relative to the projected growth assumptions. Growth factors are important because they are used to determine the emissions inventory in the attainment year for the purposes of developing the control strategy and attainment demonstration. Although the industry average growth assumptions can serve as a good starting point, the assumptions and factors should be modified to reflect local conditions. Per employee factors, per capita factors, and per unit area factors are particularly difficult to apply in this context. An updated version of the Economic Growth Analysis System (EGAS Version 4.0) is expected to be available in the spring of 1999. EGAS uses econometric principles to develop growth forecasts for industry sectors that are specific for urban areas. The forecasts of sector growth can be modified based on the overall mix of major industries and service activities in each area. The new system will include several upgrades related to projecting future activity in the utility and mobile source sectors specifically. EGAS was developed primarily for application to ozone precursors and therefore may not be useful for some of the improtant PM-2.5 sources. Information on EGAS can be found at the following Internet site:

http://www.epa.gov/ttn/chief/ei_data.html#EGAS

3.4 INVENTORY DEVELOPMENT TOOLS

EPA is developing a set of tools to assist the States in the preliminary evaluation and planning for PM-2.5 to support future air quality management activities. Currently, EPA has compiled an inventory of PM-2.5 emissions for all counties based on the current understanding of emissions processes and availability of emission factors. That inventory is included as part of the 1996 NET inventory database and is intended to support the States in preliminary assessments of important issues, and to help prioritize future planning and development efforts. The 1996 NET inventory and updates to the NET inventory that will be developed over the next two years will serve as the preliminary basis for future planning purposes. These planning activities will also support the development of improved national inventories that are needed to support regional modeling efforts. EPA is also supporting efforts to bring all of the various methods for estimating area source emissions together into a single shell program to assist in the development and improvement of PM-2.5 emissions data. It is anticipated that the computer program, referred to as the Area Source Emissions Model (ASEM), will be available for State use sometime in the Fall of 1999. Some of the features of the 1996 NET inventory and the ASEM are discussed in this section.

3.4.1 Summary of the NET Inventory

The National Emissions Trends (NET) inventory for 1997 represents EPA's most recent and most complete National-level air emissions inventory. (EPA, 1997, EPA 1998c) The NET inventory has evolved from the 1990 Interim Emissions Inventory, although the database does include several more detailed and specific estimates. The NET inventory includes estimates of annual and summer day emissions for VOC, NO_x, CO, SO_2, PM-10, PM-2.5, and NH_3. Emissions are estimated for all States and the District of Columbia. Point source emissions are reported at the AIRS segment/SCC-level, and area and mobile sources are reported at the county/SCC-level.

The NET inventory is the result of one of EPA's standing commitments to distribute an assessment of air quality and emissions trends over time. These trends inventories have historically been useful for tracking progress of air quality management programs and in demonstrating a relationship between control programs and improvements in air quality. The NET inventory was developed with significantly more process-level detail than many previous National-level inventories. One reason for improving the detail is simply to take advantage of other programs that have developed more complete and specific inventory data. Another reason is to provide a National-level inventory with sufficient detail and coverage so that it can be used by States as the basis for their preparation of the 1996 Periodic Emissions Inventory (PEI).

A version of the NET inventory for 1998 is currently in development. Updated CEM and VMT data will be applied to the 1997 database, which will yield final utility and onroad emissions. Thus, once the 1998 NET inventory is complete, the 1997 data will also be updated.

State-specific data developed to support the Ozone Transport Assessment Group (OTAG) analyses in the eastern United States and similar data developed by the Grand Canyon Visibility Transport Commission (GCVTC) in the west were used to overwrite emissions developed by EPA. These data were compiled in State supported collaborative efforts and are believed to be more representative and detailed than any data that can be prepared at the National-level. The exceptions are on-road mobile categories for which State-specific data were not used (other than VMT), and utilities. Data for utilities were taken directly from continuous emission monitors (CEMs) from the acid rain program, and Department of Energy Survey Forms (DOE Form 767).

The methodologies applied to prepare the NET inventory for emissions for States in other regions and for source categories that were not of interest in OTAG and/or GCVTC are summarized in Table 3.1. A more detailed discussion of the inventory preparation methodologies applied to the NET inventory can be found in a document titled "National Air Pollutant Emissions Trends Procedures Document 1900 - 1996," (EPA, 1998c) which can be found at the Internet address provided below. Data summaries for PM-2.5 emissions can also be found in the trends update section at the Internet address below. More detailed estimates of PM-2.5 for States and counties will be available through this Internet page in the future.

http://www.epa.gov/ttn/chief/trends97/emtrnd.html

The nature of the PM-2.5 problem requires both regional and local analyses for solid forms of directly emitted fine particles, condensable fine particles, and those formed as secondary particles through chemical reaction in the atmosphere. Emissions data are required for NO_x, SO_2, and NH_3 to serve as input to models that will simulate the regional formation of sulfate and nitrate secondary particles, VOC to evaluate the formation of secondary organic aerosol, as well as PM-2.5 that is directly emitted in both solid form and condensable form. States will need to estimate the emissions of these precursor gases. Models will be used to estimate how much PM-2.5 is formed by them in the atmosphere. As a result, the effort that will be required to develop the emission estimates to support this complex air quality planning effort may be, in many ways, more demanding than those completed in the past for other criteria pollutants. The 1996 NET inventory provides an excellent starting point for this effort. States are encouraged to review the data and the description of the methodologies used to develop the data, and use that process to help assess the apparent strengths and weaknesses of the inventory and to prioritize future inventory development efforts. As States develop improved estimates for specific source categories, they will be encouraged to share those data with EPA for application to an improved base-line National inventory of PM-2.5 for the 1999 base-year.

General data quality assessments of the emissions of PM-2.5 and it precursors in the draft NET inventory are provided below. States are encouraged to make their own data quality assessments based on the nature of the PM-2.5 that affects the State (e.g., transport, locally generated, secondary) and the source mix that is suspected of contributing to high PM-2.5 concentrations in any given area.

NO_x In general, the quality of the NO_x data is good. Data from large utilities are available from CEMs through the acid rain program. Data from other nonutility point sources have been supplied through OTAG and GCVTC. States are encouraged to review the data and make any additional adjustments based on local conditions and data sources.

VOC Nonutility point source data were supplied through OTAG and GCVTC. Other solvent use data are not as reliable. Some of the estimates are based on old studies and grown to represent 1996 activity levels, and others are based on national mass balance and are allocated to county-level by surrogate distribution factors. States can significantly improve these estimates based on more detailed and specific information.

TABLE 3.1 1996 NET INVENTORY DEVELOPMENT METHODOLOGY

Source Category/Sector	Methodology
Utilities	
SO_2 and NO_x	The data is CEM data from acid rain program where available with DOE 767 Survey/AP-42 used to replace data gaps.
VOC, CO, PM, NH_3	DOE 767 Survey data (throughput, controls, and fuel characteristics) with AP-42 emission factors.
On-Road Mobile	
CO, VOC, NO_x	MOBILE5b; HPMS VMT data; State provided MOBILE inputs including 1990 registration distributions, I/M programs, and summer RVP data, supplemented with national 1996 registration distribution, OMS I/M program data, AAMA survey RVP data; OMS control program data for RFG and oxyfuels; State-level/monthly temperature data; national vehicle/road type speed data.
PM and SO_2	PART5; same VMT and registration data as used for CO, VOC and NO_x.
NH_3	Emission factors based on Volkswagen data applied to the pre-1996 fleet; same VMT as for other pollutants. NH_3 emissions for subsequent on-road mobile categories will be based on factors derived by OMS.
NH_3 Agricultural Sources	1990 emissions grown to 1996 using BEA earnings data. Further adjustments will be forthcoming from Census of Agriculture data.
PM Fugitive Dust Sources	
Paved and Unpaved Roads	Same as the on-road emissions. A correction factor to account for precipitation was added to the unpaved road estimates. Controls were applied.
Agricultural Tilling	AP-42 EF's, 1996 CTIC tilling data and tilling practices.
Construction	New Emission Factors with default EPA correction parameters projected with 1996 Bureau of Census data. Controls are applied.
Wind Erosion	Modified/simplified 1985 NAPAP methodology.
Open Burning	
Wildfires	AP-42 emission factors applied to acres burned and fuel loading data from DOI and the Forest Service.
Prescribed Burning	Based on 1989 Forest Service inventory for prescribed burning with specific emissions based on the ratio to 1985 NAPAP base.
Agricultural Burning	1985 NAPAP inventory grown with BEA growth assumptions.
Other Sources	
Non-utility point sources and all other area sources	1990 to 1995 emissions grown with BEA growth factors and 1990 CAA controls applied. For selected States data were grown from 1995 AIRS/AFS submittals.
Non-road Mobile Sources	NONROAD national emissions model developed by OMS.

Source: National Emissions Inventory Documentation Attachment A (http://www.epa.gov/oar/oaqps/efig/ei)

SO_2, CO	Emissions estimates for utilities and on-road mobile sources are considered to be representative and accurate. Estimates for other sources are primarily based on the older databases with growth factors applied. State review and replacement will improve these estimates considerably.
PM-2.5/-10	Many of the estimates of directly emitted PM-2.5 emissions are based on the application of a scaling factor that is derived from size distribution functions that were available from analyses that supported PM-10 planning efforts. For most sources, these emissions estimates are thought to be representative of the source strengths. Those source strengths, however, are inconsistent with ambient air quality speciation data, which implies that a portion of PM-2.5 emissions that eminate from the Earth's surface ultimately are removed by some mechanical or chemical deposition process. Differences between the spatial and temporal nature of the inventories and air quality data are also likely to contribute to discrepancies. Therefore, emission estimates for PM-2.5 from fugitive sources are suspect and in need of improvement. While EPA is working to improve the understanding of these processes, States are encouraged to review these data and provide any additional data or supporting databases that could be used to improve these estimates.
NH_3	NH_3 is the least understood of all of the precursor species for secondary PM-2.5 formation. States are encouraged to review the data in the NET inventory to evaluate the relative importance of NH_3 in each State and to begin to collect and assemble any data that would be useful to develop improved and more specific emissions estimates. Specifically, States can begin to collect activity data representative of suspected major NH_3 source categories.

3.4.2 Development of the Area Source Model

EPA is currently conducting an effort to assemble the principal computer-based numerical tools that are used to develop and/or estimate area source emissions and link them together under an umbrella shell. This collection of tools is referred to as the Area Source Emissions Model (ASEM) and when finished, it will be made available to States to assist in the development, evaluation, and quality assurance of PM-2.5 area source emissions estimates. The ASEM can also be used by the States to prioritize, plan and eventually to improve both the basic activity data for area source categories of emissions of PM-2.5 and the precursors to PM-2.5, and the emission factors, size distribution functions, or assumptions related to emission rates for various sources.

The ASEM and the users manuals will be developed to be consistent with the methodologies used to prepare the draft 1996 NET inventory, other inventory development guidance, and inventory requirements documents that are being developed by EPA. The ASEM will include area source emissions estimation procedures for PM-2.5, SO_2, NO_x, and NH_3. To the extent possible, the ASEM will use input activity data that is already collected for other inventory applications. For some particular source categories, additional types of activity data will be necessary as well. With the exception of source categories handled by other EPA models such as PART5, and NONROAD developed by EPA and the Wind Erosion Prediction System (WEPS) developed by USDA, the program will contain default activity data for most, if not all, source categories. Emissions of PM-2.5 could be generated using these default data. States will also have the opportunity to substitute more detailed and complete locally generated activity data and/or emission factors for nearly all categories. In many cases, the default activity data included in ASEM can be improved by substituting local data that is more representative.

A review of the nature of the source magnitudes, the quality of default emission factors and other considerations associated with PM-2.5 planning efforts will help States to prioritize and plan their inventory improvement needs. States should focus limited resources on efforts to improve emissions estimates for the most important sources and source categories affecting the planning area. Once the improved activity data are developed, the ASEM will apply emission factors and calculation procedures to develop a county-level emissions inventory for PM-2.5 for whichever counties are selected. The ASEM is expected to be available for testing in the fall of 1999.

This page left intentionally blank.